INTERNATIONAL TELECOMMUNICATION UNION

ITU-T Addendum No. 1

ITU-T

X.226

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

(11/95)

DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

OPEN SYSTEMS INTERCONNECTION – CONNECTION-MODE PROTOCOL SPECIFICATIONS

OPEN SYSTEMS INTERCONNECTION – PROTOCOL FOR PRESENTATION LAYER EFFICIENCY ENHANCEMENTS

Addendum No. 1 to ITU-T Recommendation X.226

(Previously "CCITT Recommendation")

Superseded by a more recent version

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Addendum No. 1 to Recommendation X.226, was prepared by ITU-T Study Group 7 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 21st of November 1995.

NOTE

In this ITU-T Addendum, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

(February 1994)

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SUMMARY

This ITU-T Addendum provides an enhancement to the Presentation protocol specification (Recommendation X.226) by defining a new protocol option which allows an efficient presentation data transfer mechanism when there is only one presentation context, whose abstract syntax is known *a priori* to the peer protocol machines. This protocol option also permits an efficient connection establishment mechanism to negotiate such efficient data transfer when the presentation user selects only the kernel functional unit and the calling and called presentation selectors are null.

INTRODUCTION

This ITU-T Addendum is one of a set of Addenda produced to facilitate the interconnection of information processing systems in an open environment where efficiency of communications is paramount. Such efficiencies include:

a) reduction in the overhead needed to encode control information for use in bandwidth-limited environments (such as radio links) or processing-limited systems (such as switching systems);

b) reduction in the delay to set up the association between the communicating applications so that data transfer can begin expeditiously;

c) reduction in the support of unneeded functionality in certain environments where the communications requirements of the applications are limited.

This set of Addenda covers the services and protocols required to achieve such interconnection within the framework of the layers defined in the Reference Model for Open Systems Interconnection (ITU-T Rec. X.200 | ISO/IEC 7498-1).

This ITU-T Addendum provides an enhancement to the presentation protocol specification by defining a new protocol option which allows an efficient presentation data transfer mechanism when there is only one presentation context, whose abstract syntax is known *a priori* to the peer protocol machines. This protocol option also permits an efficient connection establishment mechanism to negotiate such efficient data transfer when the presentation user selects only the kernel functional unit and the calling and called presentation selectors are null.

This ITU-T Addendum provides a set of rules for communication expressed in terms of the procedures to be carried out by peer entities at the time of communication. These rules for communication are intented to provide a sound basis for development in order to serve a variety of purposes:

a) as a guide for implementors and designers;

b) for use in the testing and procurement of equipment;

c) as part of an agreement for the admittance of systems into the open systems environment;

d) as a refinement of the understanding of OSI;

e) extend the usefulness and applicability of OSI to other application domains (e.g. real-time, or low bandwidth or long-delay environments).

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ITU-T Addendum No. 1 to Recommendation X.226

OPEN SYSTEMS INTERCONNECTION – PROTOCOL FOR PRESENTATION LAYER EFFICIENCY ENHANCEMENTS

(Geneva, 1995)

0 Preamble

This ITU-T Addendum No. 1 incorporates by reference the presentation protocol specification, ITU-T Rec. X.226 (1994) | ISO/IEC 8823-1: (1994), and modifies it as specified below to describe the manner in which the enhancement defined here – namely, the protocol options for efficient presentation data transfer and connection establishment – may be selected by the presentation protocol machine when certain requirements of the presentation user are fulfilled. The text below defines new protocol options for the presentation protocol which specifies:

a) procedures for the efficient transfer of data and control information from one presentation entity to a peer presentation entity when certain requirements of the presentation user are fulfilled;

b) the means of selecting, when these requirements are met, the procedures to be used by the presentation entities;

c) the structure and encoding of the presentation-protocol-data-units used for the efficient transfer of data and control information when these protocol options are selected.

1 Scope

{No change}

2 Normatives references

2.1 Identical Recommendations | International Standards

{Add the following reference}

– ITU-T Recommendation X.691 (1995) | ISO/CEI 8825-2:1995, *Information Technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

2.2 Paired Recommendations | International Standards equivalent in technical content

{No change}

2.3 Additional References

{Add the following references}

– ITU-T Addendum No. 1 to Recommendation X.216 (1995), *Open Systems Interconnection – Service definition for Presentation layer efficiency enhancements*.

– ITU-T Addendum No. 1 to Recommendation X.225 (1995), *Open Systems Interconnection – Protocol specification for Session layer efficiency enhancements*.

3 Definitions

3.1 through 3.4

{No change}

3.5 Presentation protocol definitions

{Add the following definitions}

3.5.15 null-encoding protocol option: An option of the presentation protocol, negotiated during connection establishment, that permits a data transfer phase with zero presentation protocol control information.

3.5.16 short-connect protocol option: An option of the presentation protocol that permits an efficient negotiation, during connection establishment, of the null-encoding protocol option.

NOTE – The specification of a protocol option which defines encodings for some or all the Presentation PPDUs that are shorter than those defined in ITU-T Rec. X.226 (1994) | ISO/IEC 8823-1:1994 is for further study.

4 Abbreviations

pci protocol control information

4.1 Data units

{No change}

4.2 Types of presentation-protocol-data-units

{Add the following PPDUs at the end of the list}

SHORT-CPA PPDU Short Connect Accept PPDU

SHORT-CPR PPDU Short Connect Reject PPDU

SHORT-CP PPDU Short Connect PPDU

4.3 Other abbreviations

{Add the following abbreviations}

BER Basic Encoding Rules

PER Packed Encoding Rules

5 Overview of the presentation protocol

5.1 through 5.4

{No change}

{Add the following new subclause 5.4 bis}

5.4 *bis* Efficiency enhancements

The short connect and null-encoding protocol options are mechanisms that greatly reduce the quantity of presentation protocol control information in cases where the presentation user's requirements for presentation functionality is limited. The null-encoding mechanism can be used if one of conditions a), or b), or c) described below is true, while the selection of the short-connect protocol option requires that, in addition, both conditions d) and e) are true:

a) The presentation context definition list contains precisely one item in which the abstract syntax name is known to the responding PPM by bilateral agreement.

b) The presentation context definition list is empty and the default context is known by bilateral agreement.

c) The presentation context definition list is empty and the abstract syntax of the default context is known to the responding PPM by bilateral agreement.

d) The calling and called presentation selectors are null.

e) The presentation-requirements parameter in the P-CONNECT service includes the kernel functional unit only.

NOTE – It is left for further study to define an alternative version of the Presentation protocol encoded using PER which will permit byte-efficient presentation negotiation of the full set of Presentation functionality.

5.5 Model of the presentation layer

{No change}

6 Elements of procedure

6.1 User data parameters

{No change}

6.2 Connection establishment

6.2.1 Purpose

{Modify, using the following underlined text, the second paragraph of 6.2.1}

<u>If one of the conditions a) or b) or c) described in 5.4 *bis* for selecting the null-encoding protocol option is TRUE, the PPM may select the null-encoding protocol option for use on the established connection.</u>

The procedure uses the following PPDUs:

<u>If the null-encoding option is not selected, the connection establishment procedure uses:</u>

a) CP PPDU;

b) CPA PPDU;

c) CPR PPDU.

<u>If the null-encoding option is selected, and the conditions d) and e) defined in 5.4 *bis* are true, the connection establishment procedure uses:</u>

d) <u>SHORT-CP PPDU</u>;

e) <u>SHORT-CPA PPDU</u>;

f) <u>SHORT-CPR PPDU</u>.

6.2.2 through 6.2.4

{No change}

6.2.5 Procedure

{Add, immediately following the subclause heading the following text}

If the null-encoding option is not selected, the connection establishment procedure is described in 6.2.6 through 6.2.7.

6.2.6 through 6.2.7

{No change}

{Add the following new subclauses 6.2.8 , 6.2.9, 6.2.10 and 6.2.11 including all subclauses therein after 6.2.7.2}

6.2.8 SHORT-CPA PPDU associated parameters

6.2.8.1 Encoding choice

This shall indicate the transfer syntax to be used for the (single) presentation context (which may be the default context) as follows:

a) transparent encoding (understood by bilateral agreement);

b) Basic Encoding Rules;

c) Packed Encoding Rules (unaligned variant);

d) Packed Encoding Rules (aligned variant).

The transfer syntaxes b), c) or d) apply only if the abstract syntax is specified using ASN.1.

6.2.8.2 User-Data

This shall be the User Data parameter for the P-CONNECT response service primitive.

6.2.9 SHORT-CPR PPDU associated parameters

6.2.9.1 Encoding choice

This shall indicate the transfer syntax for the (single) presentation context (which may be the default context) as follows:

a) transparent encoding (understood by bilateral agreement);

b) Basic Encoding Rules;

c) Packed Encoding Rules (unaligned variant);

d) Packed Encoding Rules (aligned variant).

The transfer syntaxes b), c) or d) apply only if the abstract syntax is specified using ASN.1.

6.2.9.2 Reason

This parameter shall indicate that the rejection is either by the responding presentation service-provider or the responding presentation user. This parameter shall indicate the reason for the rejection of the presentation-connection establishment and shall appear as the Result parameter of the P-CONNECT confirm service primitive. It shall take one of the following values:

- presentation-user;
- reason not specified (transient);
- temporary congestion (transient);
- local limit exceeded (transient);
- called presentation-address unknown (permanent);
- protocol version not supported (permanent);
- default context not supported (permanent);
- user data not readable (permanent).

6.2.9.3 User-Data

This shall be the User Data parameter for the P-CONNECT response service primitive.

6.2.10 SHORT-CP PPDU associated parameters

6.2.10.1 Encoding choice

This shall indicate the transfer syntax to be used for the (single) presentation context (which may be the default context) as follows:

a) transparent encoding (understood by bilateral agreement);

b) Basic Encoding Rules;

c) Packed Encoding Rules (unaligned variant);

d) Packed Encoding Rules (aligned variant).

The transfer syntaxes b), c) or d) apply only if the abstract syntax is specified using ASN.1.

6.2.10.2 User-Data

This shall be the User Data parameter for the P-CONNECT request service primitive.

6.2.11 Connection establishment procedure using short encodings

6.2.11.1 When a P-CONNECT request service primitive is received by a PPM (the initiator), and the null-encoding option is selected, it shall initiate the establishment of a presentation connection by sending the SHORT-CP PPDU containing the encoding option selection parameter and user data.

6.2.11.2 If the initiating PPM is unable to establish a presentation-connection due to an inability to establish a session-connection, it shall issue a P-CONNECT confirm service primitive with a Result parameter value of “provider-rejection” and the presentation-connection shall not be established.

6.2.11.3 The responding PPM may refuse the proposed presentation-connection (if, for example, the encoding choice offered on the SHORT-CP PPDU is unacceptable), in which case it shall send a SHORT-CPR PPDU with a Reason parameter (see 6.2.9.2) included. Alternatively, if not refusing, it shall issue a P-CONNECT indication service primitive.

6.2.11.4 When a P-CONNECT response service primitive is received by a PPM (the responder) with a Result parameter value of “user rejection”, it shall refuse the establishment of a presentation connection by sending the SHORT-CPR PPDU. If it receives a P-CONNECT response primitive with a Result parameter value of “acceptance”, it shall send a SHORT-CPA PPDU and the presentation-connection shall be established.

6.2.11.5 If the initiating PPM receives a SHORT-CPR PPDU refusing the presentation-connection, then it shall issue a P-CONNECT confirm service primitive with a Result parameter value set based on the encoding of the received Reason parameter, and the presentation-connection shall not be established.

6.2.11.6 If the initiating PPM receives a SHORT-CPA PPDU accepting the presentation-connection, then it shall issue a P-CONNECT confirm service primitive with a Result parameter value of "acceptance", and the presentation-connection shall be established.

6.2.11.7 If the presentation-connection is established, the transfer syntax of the User data belonging to the (single) presentation context (which may be the default context) is set according to the encoding-choice parameter value of the SHORT-CPA PPDU.

6.3 through 6.10

{No change}

7 Mapping of PPDUs onto the session service

7.1 Connection establishment

7.1.1 through 7.1.3

{No change}

{Add the following new subclauses 7.1.4, 7.1.5 and 7.1.6 after 7.1.3}

7.1.4 SHORT-CPA PPDU

The SHORT-CPA PPDU shall be conveyed from the responding PPM to the initiating PPM in the S-CONNECT response and confirm primitives when the presentation connection is established.

7.1.4.1 SHORT-CPA PPDU associated parameters

Table 4 *bis* defines the mapping of the SHORT-CPA PPDU associated parameters onto the S-CONNECT parameters.

TABLE 4 *bis*/Add. 1 X.226

Mapping of SHORT-CPA PPDU associated parameters onto S-CONNECT parameters

SHORT-CPA PPDU associated parameters	S-CONNECT parametres	m/nm
Encoding-choise	SS-User-data	m
User data	SS-User-data	nm
m Mandatory nm Non-mandatory		

7.1.5 SHORT-CPR PPDU

The SHORT-CPR PPDU shall be conveyed from the responding PPM to the initiating PPM in the S-CONNECT response and confirm primitives when the presentation-connection is not established.

7.1.5.1 SHORT-CPR PPDU associated parameters

Table 4 *ter* defines the mapping of the SHORT-CPR PPDU associated parameters onto the S-CONNECT parameters.

TABLE 4 *ter*/Add. 1 X.226

Mapping of SHORT-CPA PPDU associated parameters onto S-CONNECT parameters

SHORT-CPR PPDU associated parameters	S-CONNECT parameters	m/nm
Encoding-choice	SS-User-data	m
Reason	SS-User-data	m
User data	SS-User-data	nm
m Mandatory nm Non-mandatory		

7.1.6 SHORT-CP PPDU

The SHORT-CP PPDU shall be conveyed from the initiating PPM to the responding PPM in the S-CONNECT request and indication primitives to establish the presentation-connection.

7.1.6.1 SHORT-CP PPDU associated parameters

Table 4 *quater* defines the mapping of the SHORT-CP PPDU associated parameters onto the S-CONNECT parameters.

TABLE 4 *quater*/Add. 1 X.226

Mapping of SHORT-CP PPDU associated parameters onto S-CONNECT parameters

SHORT-CP PPDU associated parameters	S-CONNECT parameters	m/nm
Encoding-choice	SS-User-data	m
User data	SS-User-data	nm
m Mandatory nm Non-mandatory		

7.1 through 7.10

{No change}

8 Structure and encoding of PPDUs

8.1 General

8.1.1

{No change}

8.1.2

{*Change the first sentence in 8.1.2 with the addition of the following underlined text}*

8.1.2 The structure of SS-user data parameter values <u>except for those in the SHORT-CPA, SHORT-CPR and SHORT-CP PPDUs</u> is specified using:

{Add at end of 8.1.2 the following sentence}

The structure of the SHORT-CPR, SHORT-CPA and the SHORT-CP PPDUs are specified in 8.1.4, 8.1.5 and 8.1.6 respectively.

8.1.3

{No change}

{Add the following new subclauses 8.1.4 and 8.1.5 after 8.1.3}

8.1.4 SHORT-CPR PPDU

The protocol control information (pci) of the SHORT-CPR PPDU shall be one octet, with the bits 6-4 identifying the Reason parameter and the two trailing bits consisting of the encoding-choice parameter. This pci is followed by the User-data parameter (encoded as per the encoding-choice parameter).

The encoding of the SHORT-CPR is as shown in the following bit pattern:

0yyy00zz

where:

yyy identifies the Reason parameter defined as follows:

000: presentation-user;

001: reason not specified (transient);

010: temporary congestion (transient);

011: local limit exceeded (transient);

100: called presentation-address unknown (permanent);

101: protocol version not supported (permanent);

110: default context not supported (permanent);

111: user data not readable (permanent).

and:

zz identifies the encoding-choice as follows:

00: bilateral agreement;

01: BER;

10: unaligned PER;

11: aligned PER.

The User-data shall be of type null-encoding (see 8.4.4).

8.1.5 SHORT-CPA PPDU

The protocol control information of the SHORT-CPA PPDU shall be one octet, with the two trailing bits consisting of the encoding-choice parameter. This pci is followed by the User-data parameter (encoded as per the encoding-choice parameter).

The encoding of the SHORT-CPA is as shown in the following bit pattern:

0000 00zz

where:

zz identifies the encoding-choice as follows:

00: bilateral agreement;

01: BER;

10: unaligned PER;

11: aligned PER.

The User-data shall be of type null-encoding (see 8.4.4).

8.1.6 SHORT-CP PPDU

The protocol control information of the SHORT-CP PPDU shall be one octet, with the two trailing bits consisting of the encoding-choice parameter. This pci is followed by the User-data parameter (encoded as per the encoding-choice parameter).

The encoding of the SHORT-CP is as shown in the following bit pattern:

0000 00zz

where:

zz identifies the encoding-choice as follows:

00: bilateral agreement;

01: BER;

10: unaligned PER;

11: aligned PER.

The User-data shall be of type null-encoding (see 8.4.4).

8.2 Structure of SS-user-data parameters

{No change}

8.3 Encoding of SS-user-data parameter values

8.3.1 through 8.3.2

{No change}

8.3.3

{Add at the beginning of 8.3.3 the following underlined text}

8.3.3 Unless the null-encoding protocol option is selected, the encoding of the SS-user data parameter of the S-CONNECT request and indication service primitives shall be the concatenation of the encodings of the CP-type value and the CPC-type values, if any.

8.4 Encoding of values of type User-data

8.4.1 Simple encoding

8.4.1.1

{No change}

8.4.1.2

{Add underlined text in 8.4.1.2}

The User-data value shall be of type Simply-encoded-data when the default context is used and the null-encoding protocol option is not selected.

8.4.1.3

{Add underlined text in 8.4.1.3}

The User-data value shall be of type Simply-encoded-data when the DCS contains only one member and the context management functional unit is not selected and the null-encoding protocol option is not selected.

8.4.1.4 through 8.4.3.2

{No change}

{Add the following new subclause 8.4.4 after 8.4.3.2}

8.4.4 Null encoding

8.4.4.1 This encoding shall be used when the null-encoding protocol option is selected on the Presentation connection.

8.4.4.2 Null encoding shall be the concatenation of the bit strings.

8.5 Rules of extensibility for normal mode

{No change}

9 through 10

{No change}

Annex A

{No change}

A.1 through A.6

{No change to the text}

{Add the following rows to Table A.17}

TABLE A.17/Add. 1 X.226

Abbreviated name	Name and description
STAI3	await SCA PPDU
STAI4	await P-CONNECT response

{Add the following rows to Table A.18}

TABLE A.18/Add. 1 X.226

Abbreviated name	Category	Name and description
SCA	PPDU	SHORT CONNECT ACCEPT
SCR	PPDU	SHORT CONNECT REJECT
SCN	PPDU	SHORT CONNECT

{Add the following row to Table A.20}

TABLE A.20/Add. 1 X.226

Code	Meaning
p31	Local choice and conditions for choosing the null-encoding and short-connect protocol options as defined in 5.4 *bis* are satisfied.

{Make the following changes to Table A.21: Add columns for STAI3, STAI4. Add rows for SCN, SCA. At the cell identified by [P-CONreq, STAI0] insert the following text underlined}

p02 & p03 <u>& ¬p31</u>
[04][05][02][20]
CP
STAI1

<u>p31</u>
<u>[03]</u>
<u>SCN</u>
<u>STAI3</u>

{At the cell identified by [SCA, STAI3], insert the following entry}

[12]
P-CONcnf+
STAt0

{At the cell identified by [SCN, STAI0], make the following entry}

p01 & p22
P-CONind
STAI4
¬p01 OR ¬p22
ARP
STAI0

{At the cell identified by [P-CONrsp+, STAI4], add the following entry}

p02 & p03
SCA
STAt0